

### **ABSTRACT OF THE DISCLOSURE**

Electrochemical cell comprises, in one embodiment, a proton exchange membrane (PEM), an anode positioned along one face of the PEM, and a cathode positioned along the other face of the PEM. To enhance electrolysis, platinum catalysts are present between the anode and the PEM and between the cathode and the PEM. A multi-layer metal screen for defining a first fluid cavity is placed in contact with the outer face of the anode, and an electrically-conductive, spring-like, porous pad for defining a second fluid cavity is placed in contact with the outer face of the cathode. The porous pad comprises a mat of carbon fibers having a density of about 0.2-0.55 g/cm<sup>3</sup>. Cell frames are placed in peripheral contact with the metal screen and the compression pad for peripherally containing fluids present therewithin. Electrically-conductive separators are placed in contact with the metal screen and the compression pad for axially containing fluids present therewithin. A plurality of the cells may be arranged in series in a bipolar configuration, without requiring a separate compression pad between cells (for differential pressures up to about 400 psi).